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OBSERVATIONS
ON THE
REPORT LATELY PUBLISHED BY THE HEALTH
OF TOWNS' COMMISSION,
AND ON
THE REMEDIAL MEASURES THEREIN PROPOSED
FOR ENGLAND AND WALES.

By RICHARD WHITE YOUNG, M. D., EDIN.,

President of the Royal Medical Society.

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IN endeavouring to form an estimate of the amount of evil which flows from a defective sanatory state of the physical circumstances in which a community may be placed, we shall best attain our object by ascertaining, as nearly as we can, the extent of increased mortality to which it gives rise. If possessed of such information, we can calculate with tolerable certainty the amount of sickness produced by it, as we know that for every death occurring in such circumstances, there are at least twenty cases of sickness. Perhaps the most fertile source of poverty among the lower classes, is that occasioned by the premature death of heads of families from epidemic and other diseases, inferring besides the expenses of funerals, the loss of the wages of their labour, for the period during which they would have survived had their lives not been thus cut short, and of its amount, the rate of mortality is of course an infallible index. It will also enable us to form a pretty correct general idea of the amount of want occasioned by the expenses attendant upon unnecessary sickness, and the loss of labour during such sickness.

Again, as much of the increased mortality among the lower classes is attributable to moral causes, such as intemperance, carelessness of human life, &c. the amount of this will, in some

measure, serve us as a guide as to the degree in which a community has become morally degraded in consequence of the continued depressing effect of physical discomfort. The additional burden imposed upon any portion of the community by excessive births will be indicated in the same way; seeing that, as a general rule, births increase in number with the rate of mortality. Thus we find that sickness, the number of births, poverty, and moral deterioration, next to death itself, the most important results of a neglect of sanitary laws, are greater or less as the mortality of the community in which they occur is high or low, and we can thus easily understand why all who have directed their attention to this subject have made the amount of mortality the principal object of their inquiries.

On this subject the commissioners appointed by her Majesty to inquire into the sanitary state of large towns have collected a mass of information well fitted to rouse the attention of the public. Without entering into details, the following facts, a few of the results of that inquiry, may be mentioned, as giving some idea of the enormous amount of mortality and consequent suffering among the lower classes of this country, mainly attributable to neglect of their sanitary state.

1. It has been shown that the annual mortality of large towns is always greater, in some cases to the extent of more than 2 per cent., in the worst-class streets than in first-class streets.* In the latter it is sometimes so low as 1.40 per cent.,† or 1 in 71; while in the former it is in one instance so great as 4 per cent., or 1 in 25.‡

2. That the average age at death is considerably less in worst-class streets than in first-class streets. Thus in York it is $12\frac{3}{4}$ years less in the former than in the latter.§

3. That the average age at death of all who die is in most large towns from 15 to 35 years less among artisans than it is among the better classes. Thus in Lancaster, the average age at death among a certain class of operatives (factory hands) is 14.8, while among the "gentry, professional persons, and families" it is 49.94. In Preston, among the operatives it is 18, and among the gentry 47.|| In the metropolis, it is 22 among the former, and 44 among the latter. In the suburban districts of Sheffield, it is 24 among the operatives who are employed in branches of manufacture peculiar to that town, 27 among tradesmen and their families, many of whom are of course employed in peculiarly unhealthy trades, and 70 (?) among the gen-

* Report I. vol. i. pp. 203-6.

† First Report, vol. i. p. 206.

|| First Report, vol. i. p. 165.

† Second Report, vol. ii. p. 75.

§ Report I. vol. i. p. 235.

try. In the town of Sheffield, it is 18 among the operatives who are employed in descriptions of manufacture peculiar to it, 27 among tradesmen, many of whom are similarly engaged, and 46 among gentry, professional persons, and their families.*

4. That the average age at death of all who die above 21 years is generally from 10 to 15 years less among artisans than among the gentry. Among those employed in factories in Lancaster, it is between 22 and 23 years less than among the gentry of the same place.† In that town it is 40.65 among the factory hands, 53.62 among artisans, and 63.07 among the gentry.

Dr Lyon Playfair, in his Report on the state of large towns in Lancashire, has shown that 14,000 deaths occur annually in that county which might be prevented, and that every individual in it loses 19 years of his life, and every adult more than 10 years of life, from causes which might be avoided.

It is universally acknowledged that much of this excessive mortality is owing to causes in a great measure independent of the physical circumstances of those among whom it takes place; and it becomes a question of great importance to what extent it is attributable to causes originating in, or connected with, their physical state, and capable of being arrested by sanatory interference. In pursuing this investigation, inquirers appear, for the most part, to have confined themselves to a consideration of those causes of disease which are directly traceable to want of drainage, deficient supply of water, &c., overlooking those which indirectly flow from the same source, but are equally under our control. In the latter class may fairly be included many of the moral influences which are continually at work in our large cities, in so far as they are called into existence by physical causes. Perhaps the most active of these is intemperance, one of the most fertile sources of disease, and one which is invariably most prevalent where physical discomfort is greatest. Experience has shown that the fewer attractions the working man finds at home, the more likely is he to seek enjoyment abroad, and that in proportion as his home comforts increase, does he seek to draw his happiness from legitimate sources.

The enormous infantile mortality which takes place among the lower orders is attributable to moral influences in a great measure traceable to physical causes. Among these may be enumerated neglect of children, both in health and sickness, from intemperance on the part of the parents; the administration of opiates to children—a custom prevalent to an almost incredible extent in many parts of England, and mainly due to the

* First Report vol. i. p. 265.

† Report II. vol. ii. p. 71.

carelessness of life and health, which are the invariable attendants of a low sanatory state ; and inability from youth and inexperience to rear children, the result of those early marriages so prevalent wherever the rate of mortality is unusually high. It is thus evident that in estimating the degree in which physical causes contribute to the excessive mortality in our large towns, we are not to content ourselves with ascertaining their immediate and direct effect on the public health, but must take into calculation their influence in calling into existence moral evils which are in turn fruitful sources of mortality. We are thus justified in ranking under the head of preventible mortality, not only that directly traceable to physical causes, but much of that ascribable to moral influences, and in concluding that at least three-fourths of the excessive mortality annually occurring among the lower classes of this country may be checked by sanatory interference. It will afterwards be shown that excessive poverty, undoubtedly a powerful predisponent to disease, is in a great measure dependent directly or indirectly on physical causes.

Even were it of any practical importance to ascertain to what extent physical causes operate simply as primary and immediate agents in the production of mortality, I fear it would be impossible to do so. This has been attempted in various ways, such as by citing instances where improvements in drainage and ventilation have been followed by a marked diminution of the amount of mortality in the drained districts. In all such cases, however, it will be found that the habits of the people, and often the class of inhabitants, have been improved by the change, whence we may fairly conclude that their increased immunity from disease is owing to the removal of moral as well as of physical evil.

With the same view, attempts have been made to show that infant mortality is due to physical causes alone, inasmuch as children are exempt from vices, and otherwise less under the control of moral influences than adults, and hence, that it may be regarded as a tolerably correct criterion of the share which purely physical causes have in producing the mortality prevalent in any community. But it must be borne in mind, that, although in their own persons the young are comparatively little exposed to such influences, they are so to a great extent through the medium of their parents, on whose care of them in health and sickness, as regulated by the intensity of their parental feelings, and by their character and habits,—their safety must depend until they are able to provide for themselves.

The plan has also been tried of comparing the mortality of

two districts inhabited by the same class of people, and which present no feature of dissimilarity, except that the one is well drained and ventilated and the other is not, whence any difference in the rate of mortality can only be accounted for by the difference in their sanatory state. But this expedient has been as unsuccessful as the others, for it has always been found in such cases, that the better drained district has been inhabited by a much more respectable class of tenants than the other, although coming under the same general head as artisans or labourers.

Perhaps the most fatal and calamitous form which disease takes among the lower orders, is that of fever. Its ravages are invariably more frequent and fatal, in proportion as the sanatory state of the population among whom it takes place is lower, and as, consequently upon this, destitution and wretchedness are more prevalent. Dr Southwood Smith, in his evidence before the Health of Towns' Commissioners, speaking of fever in London, says, "If you trace down the fever districts on a map, and then compare that map with the map of the Commissioners of Sewers, you will find that, wherever the Commissioners of Sewers have not been, there fever is prevalent, and, on the contrary, wherever they have been, there fever is comparatively absent." It is easy to understand that this must be generally correct, not only in London but elsewhere, inasmuch as the inhabitants of undrained districts are invariably the least favourably situated in all respects as to their sanatory state, and are consequently the poorest and most degraded.

The question, whether or not the effluvia arising from decaying animal matter be capable of producing fever, is one of little practical importance. Although it must be admitted that no satisfactory evidence has yet been adduced to show that fever may arise from this cause alone, we are not hence to conclude that sanatory measures which should provide for the speedy removal of such matter, would not have great effect both in directly diminishing some of the concurrent and accessory causes of fever, and in checking its progress when it has once made its appearance. Sanatory improvements are, on the contrary, quite consistent with the fullest acknowledgment of the theory so ably borne out by Dr Alison, that the disease is to be traced to the mental and physical depression arising from "the destitution and irregular mode of life" prevailing among those who are most subject to its attacks; seeing that a defective sanatory state is confessedly one of the most fertile sources of such intemperance and destitution.

Besides, it is admitted that fever, however it originates, is propagated much more rapidly and surely in localities where the contagious emanations arising from the bodies of those suffering from it are concentrated, by the deficient ventilation which almost invariably accompanies imperfect drainage, and among persons whose constitutions are enfeebled by the habitual respiration of vitiated air in ill-drained and ill-ventilated situations.

Mr Chadwick has calculated that the annual mortality from typhous fever alone in England and Wales, is greater than the loss sustained by the allied armies at Waterloo, and as that disease is only fatal in about 1 in 12 of those attacked, we may conclude that about 12 times the number of those who fell on that occasion are annually affected by it. But what renders the mortality arising from this cause much more calamitous than that proceeding from any other, is the circumstance that the period of life during which the constitution is most susceptible of its attacks is that between 20 and 40 years, or in other words, that in the great bulk of fatal cases, a family of young children are left without their natural protectors. The expense entailed on the public from the number of children thus thrown upon the parishes for support in consequence of deaths, most of which might have been prevented, is enormous, and yet forms but a small portion of the evil.

The amount of disease directly traceable to defective ventilation or impure air alone is very great. To this must in a great measure be attributed the rapid spread of infectious diseases among the poor, when they have once, from whatever cause, made their appearance. It has been found that men employed in-doors are more liable to consumption than out-door labourers, although in the receipt of better wages, and hence in the enjoyment of a greater degree of physical comfort. As this circumstance can only be owing to the want of pure air and exercise, and as the want of exercise alone does not, as shown in the case of literary men, exert the same prejudicial influence, it has been argued that the respiration of impure air in their crowded and ill-ventilated workshops is its principal cause. In confirmation of this view, it has been found that in workshops constructed with two separate floors, and with an engine below, from which a current of heated air is constantly rising, the number of sufferers from chest complaints is much greater, in the higher flat, where the air is hotter and more impure, than in the lower, where it is only partially vitiated.* Dr Guy found that while of 101 men having more than 600 cubic feet of air to breathe, only six were affected with pectoral complaints, out of 104 having less than 500 cubic feet, 26 were so affected.* It

* First Report, vol. i. p. 95.

is the opinion of many, that, in addition to its directly injurious effect on the health, the impure air of workshops exerts a peculiarly depressing effect on the minds and bodies of those employed in them, which prompts them to the habitual and excessive use of stimulating liquors. Dr Guy is of opinion, that 5000 adults die annually in England and Wales alone from consumption, whose lives might be saved by a proper system of ventilation in houses and workshops and other sanatory measures, and of these preventible deaths, he attributes one-sixth part to the deficient ventilation of workshops alone.*

The ruinous results of a defective sanatory state, even in a pecuniary point of view, are worthy of the most earnest attention. Among the losses sustained by the working classes from this cause, may be enumerated, the loss of the value of labour from premature deaths and preventible sickness,—the expense of funerals,—of medical advice and medicine during sickness,—of rearing a much larger number of children than are born under a better sanatory state, and a great proportion of which are not destined to reach maturity,—and of contributing to the support of the widows and children of those prematurely cut off. The annual loss sustained by the working classes in Lancashire alone, from preventible mortality and sickness, and the attendant excess of births, has been calculated by Dr Lyon Playfair at upwards of five millions Sterling. The burden imposed upon the public in the form of parish rates for the support of the families of those prematurely cut off must amount to a very large sum annually. The increased expense of life assurance, from the diminished average duration of life, must of itself form a considerable item in the annual expenditure rendered necessary by the existence of a great preventible mortality. The poverty thus created among the working classes themselves necessarily leads to over-crowding, and consequent aggravation of the physical evils which called it into existence.

The inevitable effect of a low sanatory state on the moral and religious character of a community is too forcibly illustrated by the scenes of degradation and vice, which every one of our large towns presents, to require a single remark. The process of moral deterioration is one which is rapidly advancing, and is raising up in the midst of us a vast heathen population, whose vices are at once the opprobrium of civilization, and a fearful testimony against the apathy that nursed them into existence. Nor does society at large, to whose neglect these evils are mainly owing, go altogether unpunished. A heavy tax is laid upon it, and one which is constantly increasing, in the shape of hospitals, charitable institutions, and

* First Report, vol. i. p. 93.

parochial aid, for the purpose of palliating misery, which it has never had the resolution to prevent; and it is ever more or less exposed to those epidemics, whose favourite seats are the homes of poverty and filth, but which every now and then trespass their natural boundaries, as if emphatically to remind it of its neglected duties and forgotten responsibilities.

That well-conducted sanatory measures might diminish the surplus mortality of large towns to a great extent there can be no doubt. This they would effect in the first instance, by removing many of the immediate physical causes of disease, and afterwards by elevating the moral state and improving the circumstances of the lower classes. Intemperance and poverty, two great causes of disease, have just been shown to be in a great measure attributable to a low sanatory condition, the former being the immediate and almost inevitable effect of such a state of things, and the latter being partly the result of intemperance, and partly of the loss and expenditure attendant upon a great amount of preventible sickness and mortality. It is only, then, what we are fairly entitled to expect, that on the establishment of adequate sanatory provisions, intemperance and poverty should diminish to the extent to which they have been induced by a neglect of sanatory laws, and that a corresponding decrease in the amount of mortality arising from these causes should take place. Nor is there any reason to doubt that, in the course of time, and with the aid of a well-directed moral agency, the circumstances, habits, and physical condition of the poor may be so much improved as to render their sanatory state in no great degree inferior to that of the better classes.

The effect which a sanatory enactment would have in increasing the funds at the disposal of the poor, is of itself a consideration of vast importance. The saving consequent upon the decrease of intemperance alone would be sufficient to increase incalculably the comforts of the working man; and were we to add to this, what is now utterly lost to him in wages and expenditure by preventible mortality and sickness, and by excessive births, a complete revolution would be effected in his social condition—a consideration which at once silences those objectors who tell us that it can be of but little use to ameliorate the physical condition of the people, if we do nothing to improve their circumstances. In short, it may not be too much to hope that, should extensive sanatory measures be adopted, suffering from abject poverty will, in periods of average national prosperity, become comparatively rare, while, when it does occur, society being to a great extent relieved of the burden now imposed upon it for charitable objects, and having more accurate informa-

tion as to the facts, will be both more able and willing to afford it effectual relief.

The subject of sanatory improvements is one of overwhelming interest to the political economist, as it is only by such improvement, assisted by the general diffusion of a sound religious education, that we can reasonably hope to arrest the growth of a population which threatens soon to exceed the means of supply. It has been objected to sanatory measures, that they are calculated to check the progress of diseases which have been wisely called into existence for the purpose of keeping under a redundant population, and preventing an alarming multiplication of the human species. A careful examination of facts, however, shows that a low sanatory state, so far from acting in this way, invariably leads to increase of population, which increase is, as a general rule, more rapid in proportion as the sanatory state is more defective. It is an established fact, that the number of births in any community invariably increases with the rate of mortality. This is evidently owing to the want of forethought and moral restraint characteristic of the working classes—always more remarkable as they are lower in the social scale, and leading either to early marriages, or where these are less common, to a great amount of illegitimate births. Among the working classes generally, and in manufacturing towns in particular, marriages are too often contracted immediately after the parties are capable of earning the wages of adults, whence their numerous and burdensome families. But a high mortality has also a direct effect in increasing population, as from the great mortality prevalent among children during lactation, the families of working people are for obvious reasons frequently larger than they would otherwise be. So great is the increase in the number of births from these causes, that while the births occurring in a population where the mortality is very high, or in other words, where the sanatory state is low, are much more numerous than those which take place among the higher classes, the number of children actually arriving at maturity is greater among the former than among the latter, notwithstanding the enormous infantile mortality to which it is exposed. If, then, the number of births, as a general rule, rises and falls with the number of deaths, we are fairly entitled to conclude, that sanatory measures would diminish excessive births in the same ratio as they diminish excessive deaths,—effecting this object by elevating the tone of moral feeling among the lower orders, and leading to habits of providence and self-restraint. The experience of Geneva, where a system of registration has been in existence for three centuries, is fully confirmatory of the correctness of this conclusion. The tables of that city show dis-

tinctly that for ages past the number of births has been diminishing as civilisation has advanced, and the chances of life have been increasing. In 1836 the births barely replaced the deaths.

Even were we to put out of view altogether the primary objects of sanatory interference, the considerations that we should thereby be enabled to increase to an extent of which we can at present only form an approximative idea,—the wealth and comforts of the working classes, and, to a great extent, to check the rapid increase of population, and particularly of a population such as exists in the most unhealthy parts of a country, an undue proportion of which is infantile or unable for work, and the whole liable to numerous diseases,—objects which have hitherto baffled the ingenuity of political economists, and the wisdom of statesmen,—would of themselves be sufficiently powerful to enforce it upon the legislature.

In order to form an idea of the degree in which the moral and social state of the lower orders would ultimately be benefited by improvements effected in their physical condition, we have only to consider how much it has been deteriorated by the continued operation of physical disadvantages and the neglect of sanatory laws. Few who have come much in contact with the lower orders in our large towns can entertain a doubt that no moral agency, however vigorously worked, can effect the great object of regenerating the masses of the people, unless they be first placed in circumstances of tolerable physical comfort; nor is this opinion inconsistent with the admission forced upon us by numerous examples in our own, and particularly in other countries,—that the lowest moral state may co-exist with the most favourable physical condition, since this only shows that the moral element is indispensably requisite to complete the transformation.

The inadequacy of existing provisions for the salubrity and comfort of our town population, and in many instances the entire absence of any such provisions, are attributable to a variety of causes, which have been carefully elicited in the recent sanatory inquiry. The drainage of towns has never been made the subject of comprehensive and enlightened legislation. All drainage acts, including the highway act and the various local acts, are limited in their objects and inadequate in their provisions, in consequence of which drainage is in all cases partial and imperfect, and in some towns quite unknown.

The commissioners entrusted with the administration of these acts, besides being seldom qualified for the direction of scientific works, are generally elected for a limited period, whence flow all the evils attendant upon a short tenure of office. Such bodies are also much under the control of local influences, which fre-

quently present an effectual barrier against the execution of all improvements, however loudly called for, which are calculated to affect private interests. These circumstances so far account for the partial manner in which the limited powers afforded by the local acts have been employed for the improvement of towns. The almost universal inefficiency of works of drainage is just such as a knowledge of the unscientific manner in which they have hitherto been constructed might have prepared us to expect. The evidence amassed by the Health of Towns' Commissioners shows that drainage has in most towns been executed without any general survey of the area to be drained, in consequence of which neglect, serious loss and inconvenience have in many cases been entailed from the construction of sewers at improper levels; while the area for drainage, included within the jurisdiction of the local board, is almost invariably much too limited, not including the natural outlets, or even the suburbs of the town to be drained. The principles of science have never been applied to the construction of sewers, and the individuals entrusted with their immediate execution are seldom selected with reference to their scientific attainments, but on the contrary, are frequently grossly incompetent. The consequences of all this have been that sewers are generally of a form calculated to retard rather than accelerate the flow of their contents, and hence are not only highly inefficient, but are constant sources of annoyance and disease from the fetid emanations which they give forth, and which pass into houses by the ill-constructed house drains;—that they have been executed without regard to the probable future wants of the district through which they run, and at a great unnecessary expense; and that, as an inevitable consequence of the faults of their construction, they are kept up at a great cost from the expensive alterations which they from time to time require. The principal obstacles to the more general introduction of house-drainage are the imperfections of the common sewers; the expense necessarily incurred, according to the present system, in the construction of house drains, and the unwillingness of many landlords at their own expense to furnish property in which they have only a short interest, with improvements which are to be the source of permanent benefit.

The insufficient manner in which large towns are supplied with water is attributable to the expense of its introduction into houses, according to the present extravagant mode of doing so, to its high price, and in some cases, to the deficient quantity in which it is supplied, in consequence of its being furnished by public companies whose principal object is their own aggraudisement. Building, and the external and internal ventilation

of houses, have never been made the objects of adequate legislative enactments, and the consequence has been, that the houses of the working classes are built almost solely with a view to economy in outlay, and often in direct violation of sanatory laws. The minor essentials to a high sanatory state have been similarly neglected, and from similar causes.

I shall now proceed, in the first instance, to point out hurriedly the different means by which it appears from the evidence supplied to the Health of Towns' Commissioners, that increased efficiency and economy may be secured in connection with the details of sanatory improvements, and afterwards to consider the best modes of carrying out such improvements as regards the administrative body into whose hands they should be entrusted, and the most advisable plan of defraying and levying the expenses of their execution.

Supply of water.—The superiority of the plan of furnishing water at high pressure and in constant supply to the ordinary mode, is strongly insisted upon in the evidence brought before the Commissioners. The advantages of that system are said to be the following.

1. There being no longer any necessity for tank, butt, and ball-cock, where there is a constant supply of water, the expense of introducing water into houses is diminished by more than one-half. Besides, water preserved in tanks is liable to become impure from soot and dust falling into it, an evil which is of course avoided under the operation of the system in question. The expense of keeping the cisterns in repair, and the space occupied by them in the small houses of the working classes, are saved.

2. The water will be readily applicable for the purpose of extinguishing fires, it being proposed to keep up such a high pressure as will throw water over the highest houses. For this purpose it has been proposed that fire-plugs with two jets each should be inserted along the mains 50 yards apart, so that no house would be more than 25 yards distant from a fire-plug, and that in the event of a fire breaking out, no farther delay would take place in applying the water to its extinction, than was necessary to attach the hose. In some towns where this plan has been adopted, it is said that fires are rarely allowed to proceed to a ruinous extent, and that the premiums on fire insurance have fallen considerably. In the case of a large manufactory or museum, additional security might be afforded by conveying a pipe through the whole building, and attaching a plug to it in every room with a hose ready to be applied. These fire-plugs may also be employed for watering the streets, thus superseding and saving the expense of water carts for

washing the fronts of houses and public buildings, and for scouring the pavements in dirty weather.

3. This system would afford great facilities for flushing sewers, for the general introduction of baths into private houses, for the establishment of public baths, for the erection of public ornamental fountains, for the irrigation of gardens in the suburbs of towns, and many other objects of public importance, unattainable under the prevalent system of an intermittent supply.

The expense of supplying water on this system will vary with the natural advantages of the different towns in which it is proposed to be introduced, being of course greater where the source of supply is not sufficiently high, and the water has to be raised into an artificial reservoir by mechanical power, or to be propelled by a force pump.

These advantages are represented as having had the effect of rendering the introduction of water into private houses general in those towns where this system is in operation, and this, by dividing the interest of the capital expended over a greater number of families, has reduced its price considerably. Thus, at Nottingham, a constant supply is afforded at the rate of 1d. a-week to each house, and a dividend of 5 per cent. is paid on the outlay.

In cases where a sufficient quantity of water, for the purpose of supplying a town on this plan, cannot be obtained from springs, lakes, or streams in the vicinity, the expedient may be resorted to, where practicable, of collecting the surface water of some part of the neighbourhood, as recommended by Mr Thom.

It is to be feared, however, that while such a mode of supplying water would be very desirable, its advocates have in some degree over-stated its advantages, and not taken sufficiently into account the difficulties in the way of its universal adoption. In large towns, an enormous body of water would be requisite, and this could not in all cases be obtained either from the usual sources of supply, as springs and rivers, or by the collection of surface water. Again, in cities such as Edinburgh, whose sites are irregular, a very great degree of pressure would be required to overcome the obstacles presented by the inequalities of the surface. It has also been found that when water is delivered by cocks without the intervention of cisterns, the expense incurred by the wear of the cocks from the attrition of the sand which almost all water, however well filtered, contains, has in a few years equalled the outlay which would have arisen from the introduction of a cistern with its accompanying apparatus at first. That the communication pipes must be much stronger and more expensive where the water is on high pressure, is undoubted, although this is denied by some of the advocates of that system.

In experiments recently performed in London with the view of ascertaining the applicability of water at high pressure to the extinction of fires, it was found that the addition of a second hose when the first was playing had the effect of reducing very materially the height to which the water rose. Should this result be confirmed, it will be evident that, in the event of a serious fire, not more than one hose could be brought to bear upon it effectually in this way, and that fire-engines would still be requisite. Notwithstanding, the great advantage would be enjoyed of speedy applicability, and the majority of fires would be extinguished before they had proceeded to an alarming extent.*

Such being the state of matters, it would be impossible to lay down any general rule as to the mode of supplying water which should be selected. This ought to depend on the circumstances of each individual case, more particularly with reference to the supply of water obtainable, and the physical conformation of the town and surrounding country.

Drainage.—The importance of a good supply of water is not to be estimated by a consideration of its value for domestic purposes only, but as being essential to an efficient system of house drainage. It is consequently of importance to ascertain in what way water, used for culinary and cleansing purposes, may be most effectually applied for the removal of refuse. The refuse of towns is at present principally disposed of either by being taken away at once by means of dust carts, or by subsequent removal from cess-pools, or from the sewers into which it passes, which are often so ill-constructed as to be incapable of conveying it away entirely. Experience has shown that no system of sewerage can be effectual which is not general, and which does not provide for the removal of all fluid and semi-solid refuse by the force of water passing through well-constructed house-drains, if necessary, branch drains, and common sewers. The most essential particulars to be attended to in such a system of drainage, as shown in the evidence collected by the Health of Towns' Commissioners, are as follow :

1. As a preliminary to the drainage of any town, it is indispensable that an accurate survey be obtained of its whole *geological area*. Such a survey will also be applicable to the laying of gas and water pipes, and the formation of new streets.

2. Where practicable, there should be a water-closet with a house drain in every tenement, in the construction of both of which there is great room for economy. It is of the greatest im-

* Still greater security will be afforded by means of a fire-engine just brought out by an ingenious engineer in Manchester, which is in every respect so superior to those now in use, as to render it certain that it will soon supersede all of them. It is known as "White's Patent Fire-Engine."

portance that the size of the house-drain should bear a direct proportion to the quantity of water it is expected to convey, both with a view to economy, and more particularly in order to secure hydraulic pressure. With this object it should be tubular and glazed internally, as suggested by Mr Guthrie,—an advantage of which arrangement would be that the drains of several houses might be made to enter the sewer at the same point, thus saving the expense of separate openings and valves for each. If constructed on this principle, house-drains need not be more than three inches in diameter. The economy of water which would ensue is obvious.

3. The size of branch drains and sewers should also be proportioned to the quantity of water they will probably be required to convey. The greater number of the sewers in London are at present cleaned by periodically carting away their contents, for which purpose they must be made sufficiently spacious to admit a man, and be provided with man-holes at certain intervals. It has recently been proposed, and the proposal has in some cases been carried into effect, to substitute the process of flushing, which consists in the damming up and sudden admission into the sewers of a great body of water, for this very expensive and disagreeable mode of procedure. The advantages of flushing are the following;—*a.* A great pecuniary saving is effected by it in various ways; sewers constructed with a view to being cleansed by flushing may be made much less capacious than they now are, men no longer being required to cleanse them, and do not require man-holes. The expense of cleansing them, and of carting away the contents is also saved. *b.* Fetid accumulations are prevented, and their destructive emanations in a great measure, if not entirely, abolished, partly in consequence of the absence of the accumulations which give rise to them, and partly from the gases which still form being swept away by the current. It is thus expected that traps and chimneys for the ventilation of sewers will eventually be rendered unnecessary. *c.* Private drains can no longer be choked up in consequence of obstructions occurring in the sewers. *d.* The exposure of the filth during its removal is avoided; *e.* and the health and habits of the men employed in performing that duty are no longer deteriorated. It is the opinion of many, that in the event of water and private drains being universally introduced into houses, such a large body of water will always be passing through the sewers as to effect the object of carrying off their contents without any regular flushing. The oval form appears in every respect best adapted for sewers. It is that capable of bearing the greatest degree of external pressure, and which opposes the least resistance to the passage of water. Requiring less material, oval sewers may be constructed at much less ex-

pense than the clumsy flat-bottomed drains now in use. A farther saving may be effected by constructing both branch-drains and sewers of glazed fire-clay tubes, which possess the advantages of cheapness, durability, great strength, and imperviousness to gaseous or liquid emanations.

In the execution of any plan of systematic drainage, it would be absolutely requisite that the house and branch drains should be made under the superintendence and direction of the administrative body into whose hands the construction of the common sewers would be entrusted. By this means a degree of efficiency and uniformity would be ensured that could be obtained in no other way, and the works being done by contract, a saving of 25 per cent. would be effected in their construction.

In addition to the infinitely superior efficiency, which works for the supply of water and drainage constructed in conformity with the principles just laid down, would be possessed of, the outlay necessary for their execution would probably not be one-fourth of that requisite under the present imperfect system. It has been calculated that the house of a working man may be furnished with a water-closet, or an efficient substitute for one, —a soil-pipe and a waterpipe, for L.5, or if the payment be spread over a period of thirty years, at a weekly rent of $1\frac{1}{2}$ d. One penny a-week for water being added to this, a constant supply of pure water, and all the advantages of an efficient system of drainage, may be enjoyed at a weekly rent of $2\frac{1}{2}$ d.

The experience of other countries, and of some towns in our own, has suggested the propriety of applying the sewer water of towns to agricultural purposes. It is confidently anticipated that such a step would be the means of securing to the country an enormous annual revenue from what has hitherto been generally regarded as a mere nuisance, and of contributing largely to the development of our agricultural resources. An additional advantage would be, that the water of rivers near large towns would no longer be contaminated by being made the receptacles of the contents of their sewers. Mr Smith of Deanston proposes to convey the sewer water in pipes, under a pressure of from 100 to 150 feet of altitude, to be obtained by pumping to the requisite height by means of a cheap and simple apparatus of cast-iron, to convenient points in farms several miles distant from towns, there to be distributed by jet. He suggests that the pipes for this purpose should be sunk two feet under the surface, and should have a plug opening for attaching the hose for every 40 acres. Part of the sewer water might be distributed by irrigation to meadow land. He thinks that about two applications to the tillage land in the course of the season would be sufficient.

Liquid manure is much more valuable than manure in the solid form, as it sinks at once into the soil, and comparatively little is lost by evaporation. For the same reason, the emanations proceeding from it are less offensive. Indeed, at the distance of a few miles from a large town they would be productive of no inconvenience whatever. Mr Smith is of opinion that the sewer water of towns is capable of producing an annual revenue of L.1 for each inhabitant, at which rate it would yield for London alone the enormous sum of L.2,000,000 a-year.

Ventilation.—The state of our knowledge in respect to internal ventilation is not such as to justify the recommendation for general adoption of any particular plan. It is evident that the systematic ventilation of the houses of the poor must be delayed, until the simpler and more practicable departments of sanatory interference shall have been carried out; and in the meantime it is to be hoped that the subject will meet with the prompt and active investigation which its importance demands.

The principal object to be attained in the ventilation of small rooms and workshops, and indeed in ventilation generally, is to create a current of air sufficiently great to effect the desired change, and yet not so strong as to cause a perceptible movement in the atmosphere. The difficulty of effecting this is extreme in the case of the poor, who, being to some extent enfeebled by the constant respiration of impure air, are acutely susceptible of cold, and would much rather breathe a vitiated atmosphere, whose bad effects are not perceived by them at the moment, than tolerate any plan of ventilation which would lead to the slightest draught. Several very ingenious expedients have been resorted to, with more or less success, for ventilating the houses of the poor, such as the chimney ventilator of Dr Arnott, which is so constructed as to permit the vitiated air to pass into the chimney, but to prevent the return of smoke,—and the ventilating window panes of Mr Toynbee and Dr Guy. But the defective construction of the chimneys of the poor, which are frequently so large as to prevent the necessary current of air, presents a serious obstacle to the general introduction of Dr Arnott's contrivance, while Dr Guy admits that the draught occasionally created by it prevented the more general use of his. Both of these plans possess the advantages of cheapness and easy application. Much might be done in Scotland by the ventilation of the *common stairs*. These are generally very ill-aired, and their deficiency in this respect contributes much to the impurity of the atmosphere of the houses which open upon them, and which are in a great measure dependent upon them for their supply of pure air. For this purpose it would probably be sufficient to provide their windows with perforated zinc plates on Mr Toynbee's plan.

To the mode of assessment of the window-tax, has with justice been attributed much of the deficient ventilation of houses, inasmuch as it holds out a direct inducement to builders to construct houses with as few windows as possible, or, in other words, operates as a premium on defective construction. The remedy for this evil is one which might be applied without the slightest injury to the revenue, viz. to assess on the principle that every house requires a certain number of windows in proportion to its cubic contents, and to charge accordingly without reference to the number of windows which actually exist. It has been said that this question is one of no importance, so far as the poor are concerned; but it must be remembered, that although houses having less than eight windows are exempt from this tax, it is a common thing in England for several poor families to occupy different apartments in houses of such dimensions as to require more than that number of windows.

It has frequently been proposed, as a means of promoting external ventilation, that houses in the most crowded and unhealthy parts of large towns should be removed, and the spaces occupied by them converted into thoroughfares,—that cellars should no longer be tolerated as places of residence,—and that narrow and ill-ventilated streets and courts should be replaced by others constructed on approved principles. Such a proposal appears, at first sight, to furnish an excellent remedy for the evils attendant upon overcrowding, and one whose execution need only be retarded by the great expense with which it would be accompanied, from the high price of property in central situations. Farther consideration, however, will show that its rash adoption might be followed by the most disastrous results. The direct effect of forming a thoroughfare in a crowded district, without having first provided accommodation for its inhabitants elsewhere, is to cause farther overcrowding in the immediate neighbourhood, in all likelihood too densely inhabited already. A similar result will follow the clearing away and rebuilding of a crowded district on scientific principles, as such a district, in its improved state, would probably not accommodate half the number of inhabitants that it had done before. Nor is it sufficient to obviate this evil, that cheap residences should be erected in the suburbs of the town for the ejected inhabitants, artisans finding it inconvenient to reside at a distance from their places of work, and the poor being unwilling to remove themselves far from charitable institutions. In small towns this difficulty would be less felt, and in large cities it might be in part obviated, by the parishes rendering it imperative on as many of their paupers as could do so without great inconvenience, to reside in such houses in the suburbs, by which arrangement, an improvement, proportionate to the number of individuals removed, might

be effected in the width and ventilation of the districts they had left. It would also be necessary, in rebuilding crowded districts, at least in our large cities and manufacturing towns, so to proceed in laying out the new streets, as that as large a number of their former inhabitants might be permitted to remain in them as was consistent with a due regard to sanatory regulations. In small towns the inconvenience felt by the removal of a portion of the population to the suburbs would be comparatively slight, and there would be no serious difficulty in the way of extensive structural improvements; but, in large cities, the formation of new thoroughfares and the rebuilding of neglected districts ought in all cases to be accomplished with much caution and by degrees. It has been proposed to prohibit entirely the use of cellars as places of abode, and at once to eject their tenants. In Liverpool, this was enjoined by an act, doubtless with the most benevolent intentions; but so little had those who framed it considered its probable results, that they had made no provision in the way of new places of residence for the large population which would have been left without houses had it been actually carried into effect. Nor must it be forgotten that the cellars of Manchester and Liverpool are no worse, in a sanatory point of view, than an immense number of ordinary dwellings, and there appears to be no good reason why their extinction should not, like the remodelling of the latter, be effected by degrees. At any rate, it is only reasonable that such of them as are provided with a fireplace and window, and whose foundations are dry, should be allowed to remain, and that the disuse of the rest as places of residence should not be insisted upon, until adequate and available accommodation has been secured for their inhabitants elsewhere.

Much might in the meantime be done to promote the external ventilation of courts and alleys, by removing such walls or houses as close them up at either end so as to prevent a free current of air.

Building.—One of the most important principles to be borne in mind in the construction of dwellings for the poorer classes, is that they should be reared at as small an outlay as is consistent with a due regard to sanatory requirements. Should this rule be disregarded, the rents will of course be high, and overcrowding will be the consequence. Accordingly, those who are best able to judge of such matters are of opinion, that it would be unjustifiable to add to the expense of such tenements by insisting, as has been proposed, on increased thickness of their walls, on the ground that moderate thickness is sufficient for stability; and that party walls, to prevent the extension of fires, are equally uncalled for, as fires are of extremely rare occurrence in that class of houses, a circumstance principally attributable to their seldom being left unoccupied. The sum saved to each house by dispensing with

party walls would generally be sufficient to defray the cost of furnishing it with all the essentials of efficient drainage, and of introducing water. It is at the same time an ascertained fact, that houses may be provided for the working classes, furnished with every requisite of comfortable and salubrious habitations, at the same or even at a less rent than they pay for their present accommodation,—that the builders will reap a fair return for the capital so expended, and this without taking into account the saving that would be effected by dispensing with party walls.

It is indispensably requisite, in a sanatory point of view, that all houses to be built in future should be provided with a water-closet, house-drain, water-pipe and sink; that the number of their windows should be proportioned to their cubic contents; that the windows should be of certain dimensions, and should open from above; and that, in the event of their being built without sunk stories, their foundations should be sufficiently deep to ensure dryness. The rooms should be small, as the inevitable consequence of their being too large, would be to increase the rents and hold forth a strong temptation to overcrowding.

The best rule that can be laid down as to the width of courts, is that contained in the twenty-third recommendation of the Health of Towns' Commissioners, and which leaves no room for evasion.*

With regard to the style of building most appropriate for the residences of the working classes, there are various reasons for preferring the system of building in separate flats, as practised on the continent and in Scotland, to that prevalent in England. One great advantage of the former plan, is the much finer and more imposing appearance which a town built in that manner presents, than one consisting of an interminable stretch of small two-storyed houses. The flat system also appears to be more favourable to the existence of that independence of each other so desirable among the poor, and which must suffer to some extent where a number of families occupy the same house, and are only separated from each other by thin partitions, as is frequently the case in English towns. It is true that there may be subdivision of *flatted* as well as of *self-contained* houses; but this, besides not being so common, might be to a great extent prevented for the future, by reducing the size of the separate and independent compartments of which each flat consists; whereas any attempt to reduce the size of self-contained houses, so as to suit the poorest class of tenants, would call into existence a number of streets even more insignificant and paltry in their appearance than the worst specimens of that class now existing. Nor is there anything in the

* "Courts and alleys should not be built of a less width than twenty feet, and should have an opening of not less than ten feet from the ground upwards at each end; the width of the court being in proportion to the height of the houses."

flat system essentially incompatible with a high sanatory state, although the bills of mortality of some of our large Scotch towns are unfortunately too well calculated to induce such a belief. The most cursory examination is sufficient to show that the unhealthiness of such towns is attributable to the total neglect of scientific principles, observable in their construction, as well as to the absence of drainage and the want of an adequate supply of water, and not to the circumstance that the houses are built in flats. In some parts of the old town of Edinburgh, for instance, the rule that the width of streets should increase with their height, appears to be reversed; and houses eight or nine stories high are separated by lanes as many feet wide. Besides the extremely defective external ventilation which such a state of things implies, houses in these situations are quite destitute of house-drainage, and are only supplied with water by public wells. There is no reason why the flat system should not be attended by as high a sanatory state as any other mode of building, provided it be carried out in accordance with sanatory requirements, *i. e.* that the streets be of a width proportioned to their height, which should not exceed three, or at most four stories, and that each flat be supplied with water and means of drainage.

Constitution and duties of administrative bodies ;—most advisable mode of defraying expenditure of improvements, &c.—Two great barriers to sanatory improvement have been the number of independent and often conflicting jurisdictions into whose hands its various subdivisions have been entrusted, and the defective constitution of local administrative boards, which in too many instances have been swayed by local interests, and whose proceedings are frequently characterised by such a want of intelligence and uniformity as might be expected from the circumstances, that no qualification as to scientific attainments is generally exacted from those who are chosen to serve on them, and that the latter are generally elected for a limited period. To obviate these evils, it has been proposed by the Health of Towns' Commissioners that all the departments of sanatory improvement should be placed under the control of a local administrative body, to be appointed in every town, and to be subject to the supervision of the crown. With the same view, Lord Lincoln's bill contains clauses which seem worthy of adoption, providing that these boards should be elected partly by the proprietors and occupiers of houses of the rateable value of L.10, partly by the trustees of the local acts, and partly by the town-council, and that one-third of their number should go out of office every third year.

In the event of such a board being formed in every town and district, the powers with which it appears desirable that it should be invested are the following.

1. To construct sewers wherever they are wanting and enforce

universal house-drainage, by means of duly qualified officers appointed by itself,—on one general plan,—and otherwise in conformity with the principles formerly laid down.

It would be found difficult, and in many cases impossible from the want of space in the confined houses of the poor, to introduce a water-closet into every house. The arrangement to be adopted with regard to this very important point would consequently depend on the circumstances of different towns and districts with respect to accommodation, and it would probably be sufficient that the local administrative body should be directed to make their introduction as general as possible. In certain cases, the establishment of well-regulated public water-closets might compensate for the want of sufficient provision of this nature in private houses, and in Scotch towns, a water-closet would be sufficient for every flat.

2. To enforce the general introduction of water into private dwellings, and to procure a sufficient supply for this and the other purposes formerly mentioned. The propriety of introducing water into the houses of the poor, in preference to the plan of supplying them by means of public wells, is universally acknowledged. There are many objections to that expedient, the principal of which is the labour thereby entailed upon the poor of conveying the water from such wells to their houses,—which labour, if properly applied, would in most cases be sufficient to produce a return by far exceeding the cost of a constant supply of water in their own premises. Another great evil is the natural effect of such a state of things in causing an undue economy of water among the poor.

The selection of the mode of supply, whether on the intermittent plan or that of constant supply at high pressure, must depend on the physical advantages of different towns, the latter being adopted in all cases where it is practicable.

The imperfect supply of water afforded by public companies has been a fertile source of complaint in almost all large towns. The only effectual check which the public has upon water-companies, is that afforded by the formation of rival establishments, an expedient which may effect the desired object in the meantime, but sooner or later leads to an aggravation of the evils complained of. The experience of London and other large towns shows that the reduction of price which in such cases ensues at first, soon becoming ruinous to both parties, leads eventually to an amalgamation and a renewal of the monopoly. Even were the companies after their union willing to afford water at as low a remunerative rate as possible, it would be impracticable for them to do so nearly as cheaply as might have been done before the second company was formed, as the same revenue has now to pay interest on two capitals, and defray the expenses of two separate establishments,

as well as the wear and tear of two sets of pipes, as formerly had only to pay interest on one capital, and defray the expenses of one establishment. Competition thus being the only species of control which the public are capable of exerting over water-companies, and its ordinary results being such as have been stated, it has frequently been proposed to secure the safety and interests of both parties, by placing the latter under a public trust. On this ground, it appears advisable, in order to facilitate the supply of towns with water under the proposed sanitary arrangements, that in all cases where the companies are willing to agree to such a proposal, the management of the water-works be transferred to the local administrative body, on such terms as the company will accept.

When no such arrangement can be effected, the recommendation of the commissioners may be adopted, which is that, "where any independent body has the management of the supply of water, it be liable to comply with the demand of the local administrative body on equitable terms." The commissioners also recommend, "that on the establishment of new companies, it be made a condition that the local administrative body be enabled to purchase the works after the lapse of a certain number of years, upon certain terms, and upon a rate of interest to be fixed." There seems, however, to be no good reason why the local administrative body should not themselves be empowered to construct whatever additional works may be required.

3. To take measures for the gradual improvement of crowded districts, by opening new thoroughfares and rebuilding and widening streets and courts, and to raise money for this purpose. For reasons already assigned, this must be done with the greatest caution,—care being taken that no district be so improved until available accommodation shall have been provided for its inhabitants elsewhere. No time should, however, be lost in removing such walls or buildings as obstruct the ventilation of courts.

4. To regulate the width of new streets, courts, and alleys, and to see that all houses be constructed in conformity with the principles formerly laid down.

5. To raise money for building streets in the suburbs, or the nearest vacant spaces, for the accommodation of those who may, from time to time, be ejected from cellars, or driven, in the progress of structural improvements, from crowded districts.

6. To provide for the gradual abandonment of cellars as places of residence, excepting such as possess the qualifications for exemption contained in the 24th recommendation of the commissioners.

Lord Lincoln's bill contains a clause to the effect, that all cellars, with certain exceptions, should cease to be occupied immediately after the act should come into operation. But supposing

that such a measure were carried into effect, and even that places of residence had been provided for their inmates in the suburbs, the difficulties formerly stated in connection with the accommodation of the ejected inhabitants of improved districts would present themselves. Instead, therefore, of laying down any regulation as to the precise period when residence in cellars should be prohibited, the safer plan would be, to leave the matter in the hands of the local administrative body, who might proceed to effect the object of closing them in detail, and would consequently soon be in possession of accurate information as to the most advisable mode of doing so.

7. To cause farther inquiries to be made as to the cheapest and best means of promoting ventilation,—to enforce it, when they shall deem it expedient to do so, upon places of public resort and assemblage, and more particularly upon schools, workshops, and manufactories,—to see that all public buildings, and private houses yet to be built, shall be provided with such structural arrangements as shall, after due investigation, be considered necessary for effectual ventilation,—and by diffusing popular information on the subject, to endeavour to effect the general introduction into the houses of the poor, of such a simple apparatus for ventilation as experience shall have shown to be most economical and efficient.

8. To superintend by its own officers the paving and levelling of streets and courts.

9. To provide for the daily cleansing of all streets, courts, and alleys,—for the removal of all accumulations of dung and refuse, and for the cleansing of cesspools, until they be superseded by properly constructed drains, and to appropriate all such refuse.

10. On the occurrence of any epidemic disorder, to require the landlords of all property in the affected districts to whitewash and fumigate their houses; and in the event of their delaying to do so, to cause it to be done, and to recover the expense from them. This may be most cheaply and effectually accomplished according to the plan adopted and practised with the best results by Mr Ramsay, late superintendent of cleaning in Edinburgh, to whom, I believe, the credit is due of having introduced the practice of house cleansing on a large scale.*

The appointment of a medical officer in every district by the local administrative body, to investigate its sanatory condition,—to ascertain the existence and causes of disease,†—to point out the best means of arresting the spread of epidemics, and to superintend the ventilation of public buildings and lodging-houses, has been recommended by the commissioners, and would undoubtedly have the effect of extending our knowledge of the causes of

* First Report, vol. ii. p. 383.

† A proper system of registration is essential to the right performance of these duties. It is extremely desirable that the registration act should be extended to Scotland without farther delay.

disease, and of promoting the public health. They also recommend very strongly that all common lodging-houses should be licensed, and conducted under such regulations as shall appear best calculated to promote the health of their inmates. They might be advantageously subjected to the surveillance of the medical officer of the district.

In conclusion, no measure for the sanatory improvement of large towns would be complete which did not make provision against the evils arising from interment in towns,—for the substitution of slaughter-houses in the suburbs, similar to those established at Paris, for those now in use, and for the abatement of such nuisances as the smoke of steam-engines, and the noxious exhalations of factories.

One great obstacle to the extension of drainage and the more general introduction of water into houses, is undoubtedly the unwillingness of proprietors, who may have only a short interest in the property to be improved, to defray the entire expense of what is to be a source of permanent benefit. The witnesses who were interrogated by the commissioners on this subject were unanimously of opinion, that the best mode of obviating this difficulty would be to spread the charge of such improvements as a rent over a series of years. Accordingly, the commissioners have recommended that the local administrative body be empowered to borrow, on the security of the rates, such sums as may be requisite for the execution of works of drainage, and “that the expense remain a charge upon the properties, to be levied by a special rate upon their occupiers, and recovered with interest by annual instalments within a certain number of years, unless the owners prefer to pay the cost in the first instance,” or the improved property be below a certain rental, when the landlords are to be rated, (the amount to be added by them to the rent,) “such a deduction being made as may be considered a fair equivalent for the labour and losses incident to the collection of rents on such property.” It has been calculated that the whole expenses of drainage and the introduction of water, if spread over a period of 30 years, would not amount, with the addition of 1d. a-week for a supply of water, to more than 2½d. per week; but supposing that this sum were doubled, the annual outlay thus entailed upon the working man would be far more than counterbalanced by the saving which would be effected in diminished liability to disease. The amelioration which would eventually ensue in his circumstances in other respects, would, as formerly shown, make such an outlay a source of great ultimate gain; and the willingness which this class has in various instances exhibited to pay an increased rent for sanatory improvements, shows that they are fast becoming alive to a sense of their importance, and would hail with satisfaction any measure for their general introduction which could be accomplished at a reasonable cost to themselves. There is,

however, in all large towns, a class so poor, as to be barely if at all able to pay for the hovels they reside in, a weekly rent, in some cases, not more than double the probable weekly rent entailed by sanatory improvements, and who, at present at least, would be quite unable to bear the smallest addition to it, although there is no doubt that, in the course of years, their circumstances would be so much improved as that they could easily pay more than double the sum for domestic accommodation which they now do, for being the class which suffers most severely from a neglect of sanatory laws, they would derive the greatest proportionate benefit from an amended state of things. It is even questionable if it would be possible to succeed in borrowing the money requisite to effect the desired improvements on the security of rates levied upon such a class of tenants. It has too often been found that the exemption of tenants from any share in the payment of expenses incurred in improvements made in property of this class, has resulted in the gain to the landlord of the amount of the exemption, which he has added to the rent. No such result, however, could follow the improvement of the class of houses in question at the public expense, as the landlords of such property, having the greatest difficulty in collecting the rents as they stand at present, would at once see the absurdity of any attempt to raise them. The great revenue derivable from the proper application of the sewer water of towns was formerly alluded to, and it would be difficult to find a more legitimate outlet for a portion of it than would be furnished in its appropriation to the object in question. Such a revenue would clearly be public property, and the improvement of the worst districts of large towns, although more immediately benefiting one portion of the community, would in the end be productive of the greatest advantage and economy to the whole. It would be impossible to lay down any general rule as to the rental at and below which houses should be improved in this manner. This would depend in a great measure on the value of property in the different towns to be improved.

A considerable proportion of the class of people referred to are dependent on the parish for support, and as the parishes would ultimately be relieved of a large amount of the burden imposed upon them by the excessive and in great degree preventible mortality consequent on a low sanatory state, it would be reasonable that they should defray the expenses of sanatory measures so far as incurred by those receiving aid at their hands.

In conclusion, I have only to express a confident hope that this inquiry will immediately be extended to Scotland and Ireland, where it is not less urgently necessary than it was in England, and that government will, with as little delay as possible, bring forward such a measure, as the exigencies of the case demand.

